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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/582,883

06/14/2006

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MIY-0214

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07/09/2008

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EXAMINER

LACLAIR, DARCY D

ART UNIT

PAPER NUMBER

4171

MAIL DATE

DELIVERY MODE

07/09/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/582,883	<b>Applicant(s)</b> SHIBAYAMA ET AL.	
	<b>Examiner</b> Darcy D. LaClair	<b>Art Unit</b> 4171	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/14/06</u> .   | 6) <input type="checkbox"/> Other: ____.                          |

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities: The disclosure contains multiple instances of poor grammatical usage. An example of this is in paragraph 10, where the phrase "which enables to obtain" is used. Please review the grammar and language use.
2. The disclosure contains references to methods (1) through (6), which are not clearly defined. See paragraph 41 which indicates that method (1) and (6) are to be described later, and paragraph 42 which indicates that the above method of chemical modification (1) is also referred to by a different descriptor. It appears that the specification may have been rearranged, making these references confusing. In addition, the frequent use of "above-mentioned" terminology makes deciphering the specification difficult, especially where it is not immediately apparent to what the "above" refers.
3. The disclosure refers at several instances to a property becoming "proper." An example of this is in paragraph 55, where the disclosure indicates "a distance between crystals of the laminar silicate in flake form becomes proper and effects of improvement ...." Does "proper" refer to the "preferable" qualities indicated earlier, or a trait well known in the art, or some other feature?
4. It appears that Formula 1 is missing from the specification. With regard to correction of this omission, the MPEP indicates the following:
5. "An applicant may incorporate by reference the foreign priority application by including, in the U.S. application-as-filed, an explicit statement that such specifically enumerated foreign priority application or applications are "hereby incorporated by reference." The statement must appear in the specification. See

37 CFR 1.57(b) and MPEP § 608.01(p). The inclusion of this statement of incorporation by reference of the foreign priority application will permit an applicant to amend the U.S. application to include subject matter from the foreign priority application(s), without raising the issue of new matter. Thus, the incorporation by reference statement can be relied upon to permit the entering of a portion of the foreign priority application into the U.S. application when a portion of the foreign priority application has been inadvertently omitted from the U.S. application, or to permit the correction of translation error in the U.S. application where the foreign priority application is in a non-English language.”

6. See MPEP §201.13(II)G

Appropriate correction is required.

### ***Claim Objections***

7. Claims 6 and 11-13 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. A material characterized as being composed by using the thermoplastic resin is essentially claiming the thermoplastic resin material. This is already accomplished in the claims from which 5 and 11-13 depend.

8. Claims 6 and 11-16 are objected to because of the following informalities: The phrase “is composed by using” is verbose. It is suggested that applicant use conventional claim language.

9. Claim 6 and 8 are objected to because they state that "said inorganic compound is an inorganic compound containing silicon and oxygen as a constituent element." It should read “as constituent elements” if two elements are included.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(f) he did not himself invent the subject matter sought to be patented.

11. Claims 1-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al. (US 6,060,549)

12. Claims 1-2, and 6 require 100 parts of a thermoplastic resin, either amorphous or crystalline, in combination with 0.1 to 100 parts by weight of an inorganic compound dispersed in the resin, characterized in that 75% of the shape of the molded article is maintained at temperatures above the glass transition temperature. Li teaches a thermoplastic engineering resin containing uniformly dispersed exfoliated phyllosilicate layered clay. The inorganic compound, in this case, clay, is present 0.5% to 10% by weight (col 7 ln 8-10), which covers the low end of applicant's range. Li teaches that the thermoplastic resin may be selected from an extensive list, (col 3 -col 4) including polyphenylene, which is applicant's preferred resin material. (col 4 ln 23, structure) The structure taught in column 4 is analogous to the omitted chemical

formula structure (present in applicant's foreign application), in the case where R1 and R3 are hydrogen. Based on the similarity of the taught resins and chemical structure to applicant's, the examiner has reason to believe that they would behave in a similar way, therefore maintaining structural integrity above the glass transition point of the resin. Additionally, applicant indicates that by mixing an inorganic compound having a small dispersion particle diameter, the rate of maintaining a shape is enhanced. (¶32) Between the similarities in available resins and the similarities in the silicate taught by Li and claimed by applicant, it is almost assured that the structural integrity would be maintained.

13. Claim 3 and 11 require that the dispersion particle diameter of the inorganic compound is 2  $\mu\text{m}$  or less. Li teaches that the particle will have an average diameter between about 50 angstroms and about 10,000 angstroms, with a maximum diameter of about 20,000 angstroms. (col 7 ln34-36) This is 0.005  $\mu\text{m}$  to 1 $\mu\text{m}$ , with a maximum of 2  $\mu\text{m}$ , teaching applicant's claimed range.

14. Claim 4, 8, and 12 require that the inorganic compound contains silicon and oxygen "as a constituent element." (sic) Li teaches swellable layered clay materials which include natural or synthetic phyllosilicates, such as smectic clays (montmorillonite, saponite, sauconite, magadite, kenyaite, stevensite and the like). (col 6 ln 25-30) These are clays which are silica based and contain oxygen. Additionally, they are analogous to the inorganic compounds taught by applicant.

15. Claim 5, 9-10 and 13 require a laminar silicate. Li teaches swellable intercalated layered clays, (col 6 line 37-44) including the phyllosilicates indicated

in paragraph 14, above. "Laminar" is a term for layered. Li's layered clays are analogous to applicant's laminar silicates.

16. Claim 7 and 14-16 require a film formed from the thermoplastic resin taught in prior claims. Li teaches that the composition may be formed into various shaped articles including films. (col 8 ln 43-47)

17. Claims 1-16 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Yonezawa et al. (WO 02/046312, later filed as EP 1 350 815 A1 and US 2004/0053061, utilized here as translations. Paragraph indications are based on the US document.)

18. With regard to Claims 1-2, and 6, Yonezawa teaches a material which is 100 parts by weight of a thermoplastic resin or mixture thereof and 0.1 to 100 parts by weight of a layered silicate. (abs) The examples given of the thermoplastic resin, as well as the chemical formula (1) are virtually identical to those disclosed by applicant. (¶23-40) It is therefore likely that the properties would be the same, and the deformation above the glass transition temperature would be in keeping with the deformation of applicant's invention. In addition, the laminar silicates taught by Yonezawa are almost identical (¶80), and as taught by applicant, the filler is critical in maintaining structural integrity. (applicant's ¶32) Therefore virtually identical resins and virtually identical fillers would yield virtually identical results, and this meets applicant's requirements.

19. Claim 3 and 11 require that the dispersion particle diameter of the inorganic compound is 2  $\mu\text{m}$  or less. Yonezawa teaches that particle may have

any shape, and the average length of the layered silicate is preferably 0.05 to 2  $\mu\text{m}$ , and the thickness is preferably 0.001 to 1  $\mu\text{m}$ . (¶83) This would give an average size of under 2  $\mu\text{m}$ .

20. Claim 4, 8, and 12 require that the inorganic compound contains silicon and oxygen “as a constituent element.” (sic) Yonezawa teaches that layered silicates include smectite clay such as montmorillonite, saponite, hectorite, beidellite, and stevensite, as well as swelling mica. (¶80) These are consistent with the silicas presented by applicant and these include oxygen and silicon as constituents.

21. Claim 5, 9-10 and 13 require a laminar silicate. Yonezawa teaches a layered silicate. (¶80)

22. Claim 7 and 14-16 require a film formed from the thermoplastic resin taught in prior claims. Yonezawa teaches that the material may be used in a variety of applications, including layered substrates, laminates, and several types of films. (¶134)

23. Claims 1-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Fukatani et al. (WO 01/036532, later filed as US 6,924,334 and EP 1 245 632 A1. Citations are to the US document.) with support from Yonezawa et al. (US 2004/0053061)

24. With regard to claims 1-2, and 6, Fukatani teaches 100 parts by weight of a polyolefin resin and 0.1 to 100 parts by weight of a layered silicate. (abs) While Fukatani teaches a fewer resins than applicant discloses, it is nevertheless



covers an included subset (applicant's paragraph 86-89, Fukatani col 4 line 1-28)

Based on the above argument with regard to the effect of the inorganic filler, here layered silicate, it is expected that this combination would meet the structural stability requirements of applicant.

25. Claim 3 and 11 require that the dispersion particle diameter of the inorganic compound is 2  $\mu\text{m}$  or less. Fukatani provides an example of the composition employing Bengel A (Ex. 1,2, 4, 22, 35) and New S-Ben D (Ex. 3, , available from Hojun Kogyo The same product is used by Yonezawa, (Ex. "A" 19, "D" 6-11, 20) who specified that the particle would have an average size below 2 mm. While Fukatani does not specify the required size, the examples provided demonstrate that the exemplary best mode does utilize particles with a size in the appropriate range.

26. Claim 4, 8, and 12 require that the inorganic compound contains silicon and oxygen "as a constituent element." (sic) Fukatani teaches layered silicates of the smectite type, exemplified as montmorillonite, saponite, hectorite, baidellite, stevensite, and others. (col 4 ln 41-47) These are oxygen and silicon containing clays, and number in the compounds taught by applicant.

27. Claim 5, 9-10 and 13 require a laminar silicate. Fukatani teaches a layered silicate. These are analogous.

28. Claims 1-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Iwade et al. (WO/2002/016479, later filed as US 2005/020404. Citations are to the US document.)

29. With regard to claims 1-2, and 6, Iwade teaches a composition formulated of 0.1 to 100 weight parts of a lamellar silicate in each 100 weight parts of a thermoplastic resin. (abs) Iwade teaches preferably a polyolefin resin, and enumerates many of the same compounds disclosed by applicant. While Iwade varies slightly from the entirety of applicant's disclosure, there is nevertheless a significant overlap with applicant's disclosed resins. (applicant's ¶ 68-89, Iwade ¶¶39-50) Based on the above argument with regard to the effect of the inorganic filler, here layered silicate, it is expected that this combination would meet the structural stability requirements of applicant.

30. Claim 3 and 11 require that the dispersion particle diameter of the inorganic compound is 2  $\mu\text{m}$  or less. Iwade teaches a lamellar silicate with a preferred length of 0.01 to 2 $\mu\text{m}$ , a thickness of 0.001 to 0.5  $\mu\text{m}$ . This would yield an average particle diameter of under 2 $\mu\text{m}$ , meeting applicant's claim.

31. Claim 4, 8, and 12 require that the inorganic compound contains silicon and oxygen "as a constituent element." (sic) Iwade discloses lamellar silicates which are of the smectite family, which contains silicon and oxygen constituents. (¶¶70-71)

32. Claim 5, 9-10 and 13 require a laminar silicate. Lamellar indicates fine layers. Iwade's lamellar silicates are layered, or laminar silicates. (see ¶31 immediately above)

33. Claim 7 and 14-16 require a film formed from the thermoplastic resin taught in prior claims. Iwade teaches that sheet molding may be used with this

resin (¶118), and this sheet layer may comprise a film layer, with the composition being tailored for whatever properties are required (¶125)

34. Claims 1-16 are rejected under 35 U.S.C. 102(f) because the applicant did not invent the claimed subject matter.

35. This rejection is based on the significant body of work presented by Yonezawa et al. (WO 02/046312, EP 1 350 815 A1, US 2004/0053061), Fukatani et al. (WO 01/036532, US 6,924,334, EP 1 245 632 A1), and Iwade et al. (WO/2002/016479, US 2005/020404). These documents, utilized here as prior art, share striking similarities both in inventive concept and in the content, wording, and organization of the specifications. Despite these similarities, the inventorship is not shared in common between these works.

### ***Conclusion***

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
2. Kashiwa et al. (US 2002/0107343) which describes an ethylene polymer for preparing molded articles including films, which may contain a variety of silica based compounds, including preferably, layered silicates.
3. Nishida et al. (US 5,747,575) which describes a crystalline thermoplastic resin composition comprising 100 parts by weight of resin and 0.01 to 11 parts by

weight of a laminar structure of silicate, both significantly teaching the specific elements presented by applicant.

4. Yonezawa et al. (US 2004/0053061) which is applicant's work, presenting an epoxy resin and a layered silicate, additionally comprising a metal hydroxide.

5. Fujiwara et al. (US 2005/0165151) which is applicant's work, presenting a resin composition which is 100 parts by weight of a thermoplastic resin and 0.1 to 65 parts by weight of a layered silicate.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Darcy D. LaClair whose telephone number is (571)270-5462. The examiner can normally be reached on Monday-Thursday 7:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/  
Supervisory Patent Examiner, Art Unit 4171

Darcy D. LaClair  
Examiner  
Art Unit 4171

/DDL/